

REMARKS

Favorable reconsideration of the present application is respectfully requested.

In response to the rejection of Claims 5 and 23 under 35 U.S.C. § 112, first paragraph, it is noted that the specification describes, at lines 12-14 of page 11, that the “electric resistance” of the coated body “satisfies  $100\Omega$  or less.” In view of this description and the fact that Claims 5 and 23 had originally recited that at least one of said respective thermal radiative coatings “satisfies”  $100\Omega$  or less, it is respectfully submitted that the amendment reciting that at least one of said respective thermal radiative coatings “has an electrical resistance of”  $100\Omega$  or less was sufficiently described in the original disclosure.

Claims 1-39 were newly rejected under 35 U.S.C. § 103 as being obvious over Hirayama et al in view of the newly cited U.S. patent 3,999,040 (Ellis). This rejection is also respectfully traversed.

As has already been explained, the claimed invention is based upon the recognition of unexpected results flowing from a coated body satisfying the relationships set forth in the claims. For example, Claim 1 is directed to a coated body for the members of an electronic device, which comprises a substrate covered on the surface side and back side with respective thermal radiative coatings, each having a thermal radiation property, wherein the integrated emissivities at wavelengths of 4.5 to 15.4 microns, and at  $100^\circ\text{C}$ , satisfy the relationship:  $a \times b \geq 0.42$ , wherein a is the infrared integrated emissivity from the surface side of the substrate, and b is the infrared integrated emissivity from the back side of the substrate. Criticality for the relationship set forth in the claim is evident from the Tables, e.g., Table 1 on page 81 of the specification (alternatively, see Table 3). As is there shown, the Comparative Examples 1-2, in which the relationship  $a \times b$  is less than 0.42, have a low thermal radiation property (as expressed by  $\Delta T_1$ ), leading to a poor relative evaluation. On the other hand, the remaining samples have a value of  $a \times b$  which falls within the claimed

range and which results in a significantly higher thermal radiation property as expressed by  $\Delta T1$  (see, generally, pages 79-81 of the specification).

Claim 3 recites a coated body wherein at least one of the respective thermal radiative coatings contains a blackening additive and satisfies the relationship:  $(X - 3) \times (Y - 0.5) \geq 15$ , wherein X represents the mass percentage of the blackening additive contained in the thermal radiative coating and Y represents the thickness in microns of the coating. Again, evidence of criticality for this relationship is found in the Tables. Specifically, the claimed relationship is expressed as value "P" in the Tables. For example Comparative Examples 1 and 2 in Table 1 have a P value less than 15 and exhibit a poor thermal radiation property as evaluated by  $\Delta T1$ . The other examples, on the other hand, have a P value within the claimed range and a high thermal radiation property.

Claim 20 recites a coated body for the members of an electronic device, wherein a substrate is covered on both the surface side and back side with coatings having integrated emissivities at the specified wavelengths and temperature which correspond to the relationships of equations 4 and 5 set forth in Claim 20. In this case, evidence of criticality for the specific mathematical relationships set forth in Claim 20 is found in Table 7 on page 97 of the specification. For example, the coated bodies 1-12 having a high "Q" value based on equation 4 of Claim 20 exhibit an excellent cooling property as evaluated by  $\Delta T2$ , and Examples 1-12 according to the invention having a high "R" value based on equation 5 of Claim 20 have a high thermal radiation property as evaluated by  $\Delta T1$ , as compared with the Comparative Examples 13-19 (see, generally, pages 94-99 of the specification).

Claim 21 recites a specific mathematical relationship between the percentage mass of blackening additive and the thickness of the coating. In this case, equation 6 requires that this relationship be equal to or greater than 3. As is noted on page 99 of the specification, sample 13 in Table 7 does not satisfy this relationship and has a poor thermal radiation property as

expressed by  $\Delta T1$ . Thus, evidence of criticality for the claimed relationships is set forth in the specification.

Hirayama et al is directed to a method for producing heat radiating plates for a substrate which mounts semiconductor chips (col. 3, lines 7-12). No particular radiative emissivity is described for the plates. The outstanding rejection therefore relies on Ellis to suggest the use of carbon black and the claimed emissivity in Hirayama et al. However this is respectfully traversed.

Ellis is concerned with an electrically conductive coating which can include carbon black, and which converts electricity to infrared radiation. It describes that the coating has an emissivity close to that of a black body, i.e., 0.968-0.988, in order to maximize the efficiency of the energy conversion (col. 3, lines 52-57). There is no teaching in Ellis for an emissivity differential for coatings on opposite sides of the substrate.

According to the Office Action, it would have been obvious to have employed the emissivity taught in Ellis for the “coatings,” i.e., plates, of Hirayama et al to improve radiation efficiency. However, since Ellis does not teach the temperature corresponding to the disclosed emissivity, it cannot suggest the claimed emissivity for the plates in Hirayama et al when the plates are “heated to 100°C.”

In any case, the evidence of unexpected results set forth in the specification, i.e., Table 1 as explained above, rebuts any *prima facie* case of obviousness raised by Hirayama et al and Ellis. See MPEP § 2144.05(III).

Claim 3 recites a coated body wherein at least one of the respective thermal radiative coatings contains a blackening additive and satisfies the relationship:  $(X - 3) \times (Y - 0.5) \geq 15$ , wherein X represents the mass percentage of the blackening additive contained in the thermal radiative coating and Y represents the thickness in microns of the coating. Ellis provides no teaching for the thickness of a coating or the percentage of blackening additive. Here as well,

evidence of unexpected results set forth in the specification, i.e., Table 1, as explained above, rebuts any *prima facie* case of obviousness raised by Hirayama et al and Ellis.

Claim 20 recites a coated body for the members of an electronic device, wherein a substrate is covered on both the surface side and back side with coatings having integrated emissivities at the specified wavelengths and temperature which correspond to the relationships of equations 4 and 5, wherein  $b \leq 0.9 (a - 0.05)$ . That is,  $b \leq a$ . There is no teaching in Ellis for an emissivity differential for coatings on opposite sides of the substrate. In any case, evidence of unexpected results set forth in the specification, i.e., Table 7, as explained above, rebuts any *prima facie* case of obviousness raised by Hirayama et al and Ellis.

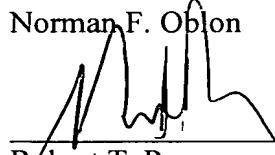
Claim 21 recites a relationship between the percentage mass of blackening additive and the thickness of the coating. In this case, equation 6 requires that this relationship be equal to or greater than 3. Ellis provides no teaching for the thickness of a coating or the percentage of blackening additive. Here as well, evidence of unexpected results set forth in the specification, i.e., Table 7, as explained above, rebuts any *prima facie* case of obviousness raised by Hirayama et al and Ellis.

Since all of the independent claims are believed to be allowable, it is respectfully requested that the nonelected Claims 19 and 37 be included in any patent issuing from the present application.

Applicants believe that the present application is in condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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